

Patent Application of  
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for

**TITLE: MULTIPLE PERSON HAMMOCK SHELTER WITH RETRACTABLE RAINCOVER**

**CROSS-REFERENCE TO RELATED APPLICATIONS**

Not applicable.

**BACKGROUND - - FIELD OF INVENTION**

This invention relates to portable shelters, particularly a tent capable of being suspended above the ground having a retractable raincover.

**BACKGROUND - - DISCUSSION OF PRIOR ART**

Tents and hammocks have been used as temporary, portable shelters throughout history. Many different shelters have been developed in order to provide a refuge from inclement weather as well as from insects and animals. Problems are inherent with both types of structures. Unlike camping hammocks, tents are not dependent upon trees to be set up. This allows a greater choice in set up location. Tents being set directly on the ground however, are soiled easily, and are detrimental to the fauna on which they are placed. Also, several problems are inherent to laying on thin fabric placed directly on the ground, including contact with and accessibility to animals of all kinds, the seepage of water through holes or seams, difficulty in driving stakes, uncomfortable lumps and uneven terrain.

Shelters elevated above such a problematic surface are innately problematic themselves. Although hammocks provide a more comfortable, dry, and clean surface than tents do, hammocks depend upon having something to hang between. In addition, prior hammocks have suffered several problems, combinations of which plague all prior portable suspended surfaces. 1) Longitudinal sag causes undue strain on the lower back and adds pressure to one's heels causing pain and hyper-extensive pressure on the knees. 2) The shelter requires attachment to the ground or to objects at the side(s) of the shelter to stabilize the structure, or to spread floor. 3) The lines used to suspend the shelter and maintain its shape easily become entangled. 4) The shelter is difficult and time consuming to set up and take down, requiring knot tying and retying, with trial and error adjustments in attempt to obtain proper tensions. 5) Most hammocks comfortably allow only one person, no matter how large the hammock is. When two people attempt to lie in a hammock simultaneously, both generally roll into the center. 6) Prior hammocks having a raincover do not allow room for individuals to stand upright in a closed vestibule area. 7) Hammocks having spreader bars do not collapse, making hiking or storage of such hammocks more difficult. 8) Hammocks with removable raincover canopies require users to exit the hammock in order to remove or apply the raincover.

## SUMMARY

The present invention is a hammock capable of being used as a tent. Entrance into the shelter is gained through either zipper door, located on opposite lateral sides of the raincover. There is a vestibule area and secondary entrance onto the hammock surface, which is gained through either of the mosquito net zipper doors. These doors are located on both lateral sides of the mosquito net.

This bed includes a raincover that is tractable and retractable from inside enclosure by use of a string and clips. These are gained access to by way of a zipper door on either longitudinal end of the bed surface.

This bed comprises of a taut surface horizontally suspended between two spaced anchors, such as trees or the like, being done so through the mechanical advantage of a double pulley system created at one of the two ends. Secondly, this bed is spread laterally with the aid of collapsible spreader poles located at each longitudinal end of the bed. Thirdly, this bed is supported against lateral tipping and sway with the use of supports. These supports run from a secondary placement on the spaced anchors, to each of the four corners of the bed and are made adjustable with cam buckles.

This bed includes a collapsible tent pole framework supporting the mosquito netting as well as the raincover. This framework works independently of the spaced anchors used to suspend the bed. Because of this independent framework, this bed may be used on the ground as a tent shelter.

## OBJECTS AND ADVANTAGES

Accordingly, several objects and advantages of invention are realized. Firstly, the invention as a hammock, with the use of a double-pulley suspension system, has removed longitudinal sag, creating in essence, a horizontal plane. This is done so in a way that the greatest tension runs through the longitudinal axis of the bed while diminishing slightly to the lateral sides. A result of the greater tension being through the longitudinal center of axis is that it affords each person the comfort of lying on his/her side without "log-rolling" toward the center or each other. In addition, the invention, with the use of collapsible spreader-poles, stretches the hammock laterally, removing lateral sag, thus adding to individual comfort. Further, if weight is placed on either lateral extreme of the bed surface, the hammock, while off balance from the main longitudinal axis, will not greatly tilt or sway. This is a result of the lateral stabilizer lines, which run from a higher position on the spaced anchors to the corners of the hammock. Because of these lateral stabilizer lines, weight may be placed anywhere on the hammock without tipping it over.

Another advantage of this invention is that relatively few lines are used to secure and tension it. The main horizontal-tension lines are the only lines permanently attached to the hammock. The stabilizer lines are independent of the hammock. These are wrapped around the spaced anchors several times, and continue to the nearest corner attachment cam buckle.

A further advantage of this invention is the means in which it is secured. Cam buckles are used at all six points of suspension, which eliminates the need of tying knots. This allows for quicker set-up as well as allowing for quick and easy adjustments.

Another attribute of the invention is the means by which it can be packed and transported with ease. Both the tent pole configurations, which support the raincover and mosquito netting, as well as the lateral spreader-poles, are collapsible in two 1-2 foot sections. Further, these poles all have a sock cord which runs internally through them. All of these qualities allow for easy assembly, disassembly, packing for hikers, and easy storage.

A further objective of this invention is to provide a means by which to attach and remove the raincover from the hammock without having to remove oneself from bed. The raincover is held in place by six clips, one in each corner as well as one at each lateral extreme of the hammock. The raincover is also connected to a string, which circles the hammock structure longitudinally in a vertical plane. The access to both the clips and the string is through a zipper window at both ends of the hammock shelter. Hence, the raincover is retracted by releasing three clips at one end of the bed and pulling the string, which in turn pulls the raincover over. To reattach the raincover, one pulls the string in the opposite direction, and then reattaches each clip. Thus, the raincover is restored.

Another objective of the invention is to be able to set the shelter up directly on the ground or ground sheet without the use of spaced anchors. This is of great advantage, should there be nothing suitable to suspend

the hammock shelter. In such a case the ground will provide the support while the mosquito net and rain cover are supported by the collapsible tent poles.

Another attribute of this invention is that it does not require additional attachment to the ground or to objects at the lateral side(s) of the shelter to stabilize the structure or spread its flooring. However, it is possible to stake out both the suspended hammock shelter's raincover, as well as the ground resting shelter's raincover to the ground in case of high winds or other severe weather.

A further advantage of this invention is that it is a multi-directional hammock, allowing persons to enter from either side and lay with head at either end. This is helpful because it takes no consideration of orientation when set-up and therefore less time to set-up. In addition, this design allows users greater individual freedom with each side of the hammock having its own vestibule space.

## DESCRIPTION OF DRAWINGS

The concept and practical aspects of the invention are apparent from the purely exemplary, and therefore not restrictive, embodiments illustrated in the following examples, in which;

FIG. 1 illustrates a perspective view of base of hammock

FIG. 2A illustrates a bottom view of hammock

FIG. 2B illustrates a bottom view of hammock with inserted collapsible spreader pole

FIG. 3 illustrates an exploded view of main lines located at end of hammock

FIG. 4 illustrates an exploded view of corner of hammock

FIG. 5 illustrates a top view of tent pole configuration and raincover outline in comparison to bed outline

FIG. 6A illustrates a perspective view with raincover retracted

FIG. 6B illustrates a perspective view with raincover rolled-up

FIG. 6C illustrates a perspective view of shelter fully staked out

## LIST OF REFERENCE NUMERALS

12 spaced anchor	46 raincover
14 hammock	48 tent-pole clip
16 fabric bed	50 mosquito netting
18 reinforced corner	52 raincover string
20 stabilizer line	54 storable raincover flap
22 elevated connecting point	56 mosquito net zipper door
24 cam buckle	58 mosquito net zipper window
26 static sheave	60 tent-pole pocket
28 spreader-pole retaining pocket	62 apex attachment
30 reinforcing strap	64 elastic strap
32 collapsible spreader-pole	66 rolled raincover flap
34 raincover clip	68 apex slip
38 main tensioning strap	70 tent stake loop
40 raincover string hole	72 raincover entrance zipper
42 tent-pole hole	74 retractor attachment
44 collapsible tent-pole	

## DESCRIPTION OF INVENTION - MAIN EMBODIMENT FIG 1-3

In reference now to the drawings, in particular to FIG. 1 thereof, as shown a hammock 14 comprises of a fabric bed 16 dimensioned to provide accommodation for one or more persons. Said bed 16 being made from a material of sufficient strength and resilience to withstand an appropriate load and repeated use under varying conditions. Nylon, polyester or a synthetic material with similar qualities is used. Said bed 16 is connected to a main tensioning strap 38 which would be made of rope nylon or polyester strap or a similar substance with similar qualities. Said strap 38 is connected at each longitudinal end. Said main strap 38, joins said bed 16 to spaced anchor 12 at each end. At one end, said main strap 38 wraps anchor 12 and is secured through cam buckle 24. At the other end, said main strap 38 wraps anchor 12, runs through sheave 26, back around said anchor 12, and is secured through cam buckle 24. The preferred embodiment of sheave 26 is that of a welded D ring but other objects functioning as pulleys can be used. Stabilizer line 20 joins reinforced corner 18 of said bed 16 at four places by cam buckle 24 to anchor 12 at elevated point 22. This connection is made by wrapping said line 20 around said anchor 12 multiple times. Length at each end of said line 20 is saved to reach nearest cam buckle 24 located on corner 18.

FIG. 2A illustrates hammock 14 from below. Reinforcing strap 30 follows curve from reinforced corner 18 until it separates from bed 16 and becomes main tensioning strap 38. A spreader-pole retaining pocket 28 is connected to each corner 18. Joined to said retaining pocket 28 is a raincover clip 34. FIG. 2B shows hammock 14 from below with a collapsible spreader-pole 32, each end of which is inserted into retaining pocket 28. Collapsible spreader-pole 32 has a shock cord internally connecting it together.

FIG. 3 shows an exploded view of hammock 14 at one end. Reinforcing strap 30 comes to a point at the end of bed 16 and continues away from said bed 16 as main tensioning strap 38. Attached to said main strap 38 is cam buckle 24, sheave 26, and raincover clip 34. Located at the end of said bed 16, where at said reinforcing strap 30 comes to a point, is a raincover-string hole 40.

FIG. 4 shows an exploded view of reinforced corner 18. Reinforcing of said corner 18 is done by means of connecting multiple layers of cloth or strap to corners of bed 16. Cam buckle 24 attaches to said reinforced corner 18. Spreader-pole retaining pocket 28 is joined to reinforced corner 18 and to reinforcing strap 30. Connected to said retaining pocket 28 is a raincover clip 34, and piercing it is a tent-pole hole 42.

## ADDITIONAL EMBODIMENTS FIG 5-8

FIG. 5 illustrates hammock 14 from above showing a collapsible tent-pole 44 configuration. Said tent-pole 44 has shock cord connecting it together. An outline of a raincover 46 and fabric bed 16 is shown. Said tent pole 44 meets with the fabric bed 16 by way of tent-pole hole 42 located in each reinforced corner 18 of said bed 16. Collapsible tent-pole 44 that crosses hammock 14 laterally is held in place by a tent-pole pocket 60, which is located in two places on raincover 46. Said collapsible tent-pole 44 that crosses said hammock 14 laterally is also held in place by an apex slip 68 located at the apex of said raincover 46.

FIG. 6A shows a perspective view of hammock 14. Collapsible tent-pole 44 with ends in tent-pole hole 42 diagonally cross bed 16. One collapsible tent-pole 44 is shown erected at the far end of said hammock 14 connected to the underside of raincover 46. Said raincover 46 depicted in FIG. 6A as retracted and laying at far end of said hammock 14. Mosquito netting 50 connected to the fabric bed 16 encloses said bed 16. Said netting 50 is lifted into position by tent-pole clips 48, which are connected to tent pole 44 in a plurality of places. The apex of said netting 50 is connected to the apex of crisscrossing tent-poles 44 by means of an apex attachment 62. Said attachment 62 is an elastic band having a portion of hook and loop material at its end. Said attachment 62 is long enough to encircle said tent-poles 44 several times as said poles 44 cross at the apex and said attachment 62 connects to itself by means of said hook and loop attachment. Mosquito netting 50 has several portals. A mosquito netting zipper door 56 is placed on both lateral sides of hammock 14. A mosquito netting zipper window 58 is placed on both longitudinal ends of hammock 14. As depicted in FIG. 6A, mosquito netting door 56 and window 58 may be held open by way of an elastic retainer 64. Also depicted in FIG. 6A is a raincover string 52, which completely encircles hammock 14 in a generally vertical plane. Said string 52 runs through raincover string hole 40, each of which is located at the longitudinal ends of bed 16.

String 52 is connected in a temporary fashion to the end of raincover 46 and is gained access to through the mosquito netting window 58. Also in this perspective view, is a storable raincover flap 54. Said flap 54 is attached to the underside of fabric bed 16, and held in a rolled manner with an elastic retainer 64.

FIG. 6B shows a perspective view of hammock 14 similar to that of FIG. 6A. The major distinction is that raincover 46 is attached, which encapsulates mosquito netting 50. Said raincover 46 is connected to all four reinforced corners 18 by raincover clips 34. In addition, said raincover 46 is connected to reinforcing strap 30 along the longitudinal center at each end by raincover clip 34. (this clip 34 is shown in detail in FIG. 3) FIG. 6B shows tent pole 44 arching perpendicular to the longitudinal line of hammock 14. Said tent pole 44 is held in position by tent-pole pocket 60 and apex slip 68 which is connected to raincover 46. Said pole 44 overhangs the side of the fabric bed 16. (see FIG. 5) Rolled raincover flaps 66 are secured by an elastic retainer 64. Said retainer 64 is permanently attached to raincover 46.

FIG. 6C shows a perspective view of hammock 14 with raincover 46 and storable raincover flaps 54 fully unrolled. As depicted in the cut away view, raincover 46 is held out of contact with the mosquito netting 50. A raincover entrance zipper 72 runs from the tent-pole pocket 60 vertically downward on each lateral side. Inside said zipper 72 is a vestibule area between the sides of the raincover 46 and the fabric bed 16 large enough to fit a standing person. The storable raincover flaps 54, which are not directly connected to the raincover 46, meet said raincover 46 when extended and staked to the ground with said raincover 46 by means of a tent stake put through tent stake loop 70. Said loop 70 is located on all grounded corners of said raincover 46 as well as said flaps 54.

## ADVANTAGES

From the description above, a number of advantages of the multiple person hammock shelter with retractable raincover become evident:

- (a) A lightweight hammock with structural integrity can be made easily.
- (b) Parts for fabrication are relatively easy to obtain.
- (c) The fabrication of the invention can be carried out mainly by use of a sewing machine.

## OPERATION OF MAIN EMBODIMENT FIG 1-4

The manner in which one would use the multiple person hammock shelter with retractable raincover is similar to that of standard hammocks only in that it is suspended between to spaced anchors, such as trees. Technically, as shown in FIG. 1, hammock 14 functions in a unique manner. This is as described in the following: Main tensioning strap 38 removes all slack from fabric bed 16. Strap 38 at the far end wraps anchor 12 and is secured with cam buckle 24. Strap 38 at near end wraps anchor 12, runs through static sheave 26, back around said anchor 12, and is secured with cam buckle 24. (parts shown in detail in FIG. 3) This said arrangement of the strap 38 at the near end creates a 4:1 mechanical advantage when tensioning hammock 14. Said arrangement with said advantage offers the means for a lay person to stretch and tension fabric bed 16 to that four times their strength, thus creating a flat taut surface.

Stabilizer line 20 joins individual reinforced corner 18 of hammock 14 in four places to elevated point 22 on anchor 12. This prevents hammock 14 from tilting under the weight of a load to one side or the other. Said lines 20 can be adjusted to influence the lay of a load. Stabilizer lines 20 are held laterally away from the longitudinal center by means of collapsible spreader-pole 32. (shown in FIG. 2B) Said pole 32 fits into spreader-pole retaining pocket 28 at each end, thus connecting it to reinforced corner 18, and thereby connecting it to the reinforcing strap 30. (best shown in FIG 2A) Said strap 30 functions to transfer load stresses delivered by the main tensioning strap 38 across the entire end of fabric bed 16. Specifically, this is done in a way that, as hammock 14 is tensioned, a more direct pull is gained through the longitudinal center. This pull diminishes gradually towards the lateral sides, as reinforcing strap 30 angles away from the centerline. The greater the load placed on hammock 14 the more the load tends to move away from the longitudinal center. Stabilizer lines 20, having an elevated advantage, counter the tendency of a load leaving hammock 14 altogether by retaining the sides at a static level. Thus, the greater the load placed along the lateral sides of hammock 14

the more it tends back towards the center. Therein, an environment is created in which two persons may lay side by side having no tendency to either roll towards or away from one another.

## **OPERATION OF ADDITIONAL EMBODIMENT FIG 4-8**

The manner of using hammock 14 as a shelter utilizes a collapsible tent-pole 44 having shock cord to aid in organization and assembly time. Said pole 44 shown in plurality in FIG. 5, functions to hold enclosure shape, suspend mosquito netting 50, and support raincover 46, while remaining light and packable. Said pole 44 contacts fabric bed 16 through an insertion into said tent-pole hole 42, (FIG. 4) which happens in each of the four corners. When hammock 14 is used as a tent, pole 44 helps to maintain a spread floor. Tent-pole 44, one of which arches laterally across the center of hammock 14 as shown in FIG. 5, is not connected directly to bed 16, but to raincover 46. This connection to said raincover 46 is at apex slip 68 and at said raincover's 46 ends by way of tent-pole pocket 60. In this way of connection, said pole 44, which arches laterally, is enabled to slide longitudinally to either end of bed 16 with raincover 46. Acting as a guide and tractor for said raincover 46 is raincover string 52, best illustrated in FIG. 6A. Said string 52, which runs through string hole 40 at each end, encircles hammock 14, allows a person inside at either end of bed 16 to operate said string 52 through the mosquito netting window 58. Said string is connected to raincover 46 at tractor attachment 74. Once raincover clips 34 are released, one is free to pull string 52, which pulls raincover 46 over the apex and on to the other side. Said string 52 functions to recover mosquito netting 50 with said retracted raincover 46 by means of pulling string in the opposite direction. Once said raincover 46 is pulled over, covering mosquito netting 50 as shown in FIG. 6B, it is clipped to reinforced corner 18 and to the longitudinal center's end by raincover clip 34. This secures raincover 46 into position. In the action of retracting and attaching raincover 46, tent-poles 44 which crisscross to opposite side tent-pole holes 42 act as a guide, channeling both string 52 and raincover 46 in the proper direction. If one desires additional protection, rolled raincover flaps 66 and storable raincover flaps 54 can be unrolled and staked to the ground as depicted in FIG. 6C. This creates a vestibule area inside raincover-zipper entrance 72 and a more weather resistant environment under fabric bed 16.

## **DESCRIPTION AND OPERATIONS OF ALTERNATIVE EMBODIMENTS**

One alternative embodiment of the multiple person hammock shelter with retractable raincover is that it may be set up on the ground as a tent. To do this a ground sheet could be laid down on which to set the shelter. Another alternative is to place rollable-raincover flaps 66 and storable-raincover flaps 54 flat under bed 16, thus, creating a water-resistant layer under the fabric bed 16. Additional tent stake loops 70 located along raincover zipper entrance 72 will make the staking of the shelter possible, thus creating vestibule space under raincover 46 on the sides of bed 16.

Another alternative embodiment of the multiple person hammock shelter with retractable raincover is that it may be used as a multiple person hammock without a mosquito netting enclosure or a raincover.

## **CONCLUSION, RAMIFICATIONS AND SCOPE OF INVENTION**

Accordingly, the reader will see that the multiple person hammock shelter with retractable raincover of this invention can be easily used by people of any age or size to achieve a high degree of comfort.

Furthermore, the invention has the additional advantages in that:

- It is easily and quickly set up and taken down.
- It doesn't use so many lines or strings that they would become intagled easily.
- It is easily and quickly adjusted with the aid of cam buckles.
- The highly tensioned bed keeps unwanted sag to a minimum, saving one's lower back, knees, and heels from unnecessary pain.
- Its unique tensioning system allows two people to lay side by side and not roll in to one another, which is a common trait among most other hammocks.
- Its outer stabilizer straps can be adjusted easily to perfect individual comfort levels.

- It utilizes a system to put on or take off a raincover in which the user will not have to leave the comfort of his/her bed to use.
- It is constructed with mosquito netting which encompasses the entire upper dome, allowing for the greatest visibility.
- It allows persons to enter or exit from either side, which aids in convenience in setting up the hammock.
- It allows a person to stand up inside vestibule area, which aids in changing cloths.
- It allows persons to sit on edge of bed without tipping bed, which aids in changing shoes and also aids those persons less flexible.
- Its double-pulley system allows one with less than average strength to tension bed tauntly.

While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as an exemplification of one preferred embodiment thereof. Many other variations are possible. For example:

- Collapsible spreader-pole 32 could be located above fabric bed 16 rather than below as pictured.
- Said pole 32 could be housed in a sheath securing pole 32 inside rather than using retaining pockets 28
- The longitudinal ends of the hammock could be attached to spreader-pole 32 as could main tensioning strap 38 be attached directly to spreader pole 32.
- A raincover and mosquito netting could be suspended from the spaced anchor rather than supported by tent poles.
- Main tensioning strap 38 can and is suggested to be used in combination with a slippery piece of fabric placed on anchor 12 where straps 38 wrap around. This both protects surfaces, and lessens friction on surfaces when tensioning hammock 14.
- The mechanical advantage gained by wrapping main tensioning strap 38 around spaced anchor 12 could be built upon by using another static sheave 26 and wrapping said anchor 12 a third time. This would result in increasing said mechanical advantage.

Thus, the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the examples given.